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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,310	09/30/2003	Stephan Jourdan	42P17034	8184
8791	7590	02/06/2006	EXAMINER	
BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030			CODY, DILLON J	
			ART UNIT	PAPER NUMBER
			2183	

DATE MAILED: 02/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/676,310	Applicant(s) JOURDAN ET AL.	
	Examiner Dillon Cody	Art Unit 2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-22 are pending.

Papers Filed

2. Examiner acknowledges receipt of claims, disclosure, and drawings, all filed 30 Sept. 2003; declaration filed 20 Jan. 2004.

Title

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the assigning of sequence numbers to each uop (claims 3 and 14), and stalling the allocator (claim 8) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure

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is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claims 12-16 are objected to because of the following informalities:

Line 1 of each claim: "to" should be removed and the verb should contain the correct ending. For instance, claim 12 should read "...the allocator further maintains a list..." The current format does not constitute a complete sentence.

Claim 12, line 2: "assign" should read "assigns"

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 6-13 and 17-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Sharangpani et al. (U.S. Patent No. 6,065,115) hereinafter referred to as Sharangpani.

8. As per claim 1, Sharangpani discloses a method comprising: assigning an identification number (ID) (Fig. 5 tag 504) to each of a plurality of micro-operations (uops) to identify a branch path to which the uop belongs; determining whether one or more branches are predicted correctly; determining which of the one or more branch paths are dependent on a mispredicted branch; and determining whether one or more of the plurality of uops belong to a branch path that is dependent on the mispredicted branch based on their assigned IDs. (Col. 10 lines 6-20)

9. As per claim 2, Sharangpani discloses the method of claim 1, further comprising retiring a uop that belongs to a branch path dependent on a mispredicted branch. (Col. 10 line 18-20)

10. As per claim 6, Sharangpani discloses the method of claim 1, further comprising maintaining a list of available IDs. (Col. 10 lines 32-39)

11. As per claim 7, Sharangpani discloses the method of claim 6, wherein assigning an ID to each of a plurality of uops to identify a branch path to which the uop belongs

comprises assigning by an allocator (Fig. 3 stream management logic 109) an ID for each of the plurality of uops from the list of available IDs. (Col. 10 lines 6-20)

12. As per claim 8, Sharangpani discloses the method of claim 7, further comprising stalling the allocator if there is no available ID to be assigned. (Col 10 line 61-Col. 11 line 6) *The examiner asserts that if insufficient resources are available, the processor holds an instruction stream until they become available.*

13. As per claim 9, Sharangpani discloses the method of claim 7, further comprising placing an ID on the list of available IDs when all uops that have been assigned that ID have been retired. (Col. 11 lines 53-61)

14. As per claim 10, Sharangpani discloses an apparatus comprising: an allocator (Fig. 3 stream management logic 109) to assign a plurality of micro-operations (uops) identification numbers (IDs), each ID to identify a branch path to which the uop belongs; (Col. 10 lines 6-20) a jump unit (Fig. 3 branch processing and prediction logic 316) coupled to the allocator to determine whether branches are predicted correctly (Col. 6 lines 53-62); and an execution unit (Fig. 3 execution logic 320) coupled to the jump unit to determine which uops belong to a branch path that is dependent on a mispredicted branch based on their assigned IDs. (Col. 11 lines 48-53)

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15. As per claim 11, Sharangpani discloses the apparatus of claim 10, further comprising a retire unit (Fig. 3 retirement and write back logic 326) coupled to the jump unit to retire uops that are related to a mispredicted branch. (Col. 11 lines 48-53)

16. As per claim 12, Sharangpani discloses the apparatus of claim 11, wherein the allocator further maintains a list of available IDs and assigns an ID for each branch from the list of IDs. (Col. 10 lines 32-39)

17. As per claim 13, Sharangpani discloses the apparatus of claim 12, wherein the retire unit further places an ID on the list of available IDs when all uops that have been assigned that ID have been retired. (Col. 11 lines 53-61)

18. As per claim 17, Sharangpani discloses the apparatus of claim 10, further comprising an instruction fetch unit (Fig. 3 fetch unit 304) coupled to the allocator to fetch a next instruction based on a next instruction pointer. (Col. 5 lines 45-50)

19. As per claim 18, Sharangpani discloses the apparatus of claim 17, further comprising an instruction decode unit (Fig. 3 decode unit 306) coupled to the instruction fetch unit to decode the fetched instructions. (Col. 5 lines 58-61)

20. As per claim 19, Sharangpani discloses a system comprising:

an input/output (I/O) controller; *The examiner asserts that Sharangpani's invention takes in input and produces output, all of which must inherently be controlled. Without an I/O controller, the device would be unable to read input or produce output, rendering the system useless.*

and a processor (Fig.1 processor 101) coupled to the I/O controller, the processor including:

an allocator (Fig. 3 stream management logic 109) to assign micro-operations (uops) identification numbers (IDs), each ID to identify a branch path to which the uop belongs; (Col. 10 lines 6-20)

a jump unit (Fig. 3 branch processing and prediction logic 316) coupled to the allocator to determine whether branches are predicted correctly; (Col. 6 lines 53-62)

and an execution unit (Fig. 3 execution logic 320) coupled to the jump unit to determine which uops belong to a branch path that is dependent on a mispredicted branch based on their assigned IDs. (Col. 11 lines 48-53)

21. As per claim 20, Sharangpani discloses the system of claim 19, wherein the processor further comprises a retire unit (Fig. 3 retirement and write back logic 326) coupled to the jump unit to retire uops that are related to a mispredicted branch. (Col. 11 lines 48-53)

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22. As per claim 21, Sharangpani discloses the system of claim 19, wherein the processor further comprises an instruction fetch unit (Fig. 3 fetch unit 304) coupled to the allocator to fetch a next instruction based on a next instruction pointer. (Col. 5 lines 45-50)

23. As per claim 22, Sharangpani discloses the system of claim 21, wherein the processor further comprises an instruction decode unit (Fig. 3 decode unit 306) coupled to the instruction fetch unit to decode the fetched instructions. (Col. 5 lines 58-61)

Claim Rejections - 35 USC § 103

24. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

25. Claims 3-5 and 14-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Sharangpani in view of Rodgers et al. (U.S. Patent Application Publication No. 2003/0061258) hereinafter referred to as Rodgers.

26. As per claims 3 and 14, Sharangpani discloses the method of claim 1 and apparatus of claim 10, but fails to disclose the processor further comprising assigning each of the plurality of uops a sequence number.

27. Rodgers discloses assigning each of a plurality of uops a sequence number.
(Paragraph 80 lines 20-28)

28. Rodgers discloses that multithreaded processing "provides the potential for more effective utilization of various processor resources." Since Sharangpani's invention also executes instructions out-of-order (Sharangpani col. 6 lines 10-14), it would be desirable to have a system to ensure that all instructions are retired in a correct order to ensure proper processor functionality.

29. It would have been obvious to one of ordinary skill in the art at the time of invention to have included Rodgers' issue/retire scheme of assigning and using sequence numbers in Sharangpani's processor for the benefit of ensuring proper operation.

30. As per claims 4 and 15, Sharangpani and Rodgers disclose the method of claim 3 and apparatus of claim 14, further comprising storing the sequence number of an oldest valid uop (Rodgers retirement pointer 180) in each branch path. (Rodgers paragraph 79 and paragraph 80 lines 20-28) *The examiner asserts that all valid uop sequence numbers are stored in the table 180, including the oldest.*

31. As per claims 5 and 16, Sharangpani and Rodgers disclose the method of claim 4 and apparatus of claim 15, further comprising comparing the sequence number of a uop to the sequence number of the oldest valid uop in a same branch path. *The examiner asserts that before an instruction is retired, the retirement pointer must be compared to the pending instruction.*

Conclusion

32. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Abdallah et al. (U.S. Patent No. 6, 918,032) disclose a system which tags micro-instructions to identify the associated conditional branch path/instruction.

Lee et al. (U.S. Patent No. 6,629,271) disclose a reorder buffer which utilizes sequence numbers assigned to each microinstruction to ensure proper retirement order.

33. The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dillon Cody whose telephone number is 571-272-8401. The examiner can normally be reached on Mon - Fri, 8 AM - 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on 571-272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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